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RESEARCH ON BUILT-IN TESTING METHODOLOGY OF SMALL SATELLITE

Abstract

Rapidness is an important characteristic of the small satellite, to increase satellite production rate, except the standardization of functional components, implementation of satellite quick test is also very important. At present, satellite integrated test is mainly functional test based on validation of telemetry, which is with low efficiency and poor coverage. Automated test released test engineers from heavy manual operation, but to reduce fault isolation time and eliminate constraints brought by telemetry update rate, built-in test should be developed. In this paper, a new built-in test method based on CAN bus was proposed, applying which a ground central built-in test computer was connected to the satellite CAN bus. In built-in test mode, the computer accesses RTUs (Remote Terminal Unit) of satellite instead of House Keeping subsystem, then RTUs transmit detailed test data to built-in test computer through CAN bus to locate faults more rapidly and handle them on the spot. Due to TTC(Tracking, Telemetry command) subsystem bandwidth constraints, some of the data transmitted in built-in test mode will not be transmitted in obit when the satellite operate normally. Thus, sub-system is no longer a "black box", but transparent within satellite integrated test phase.Because there's no need to increase electronic equipment on the satellite, this methodology has the advantages of simple structure, low cost, good testability and compatibility.